



Full MINERvA Begins!

Gabriel N. Perdue

The University of Rochester

2010.March.29

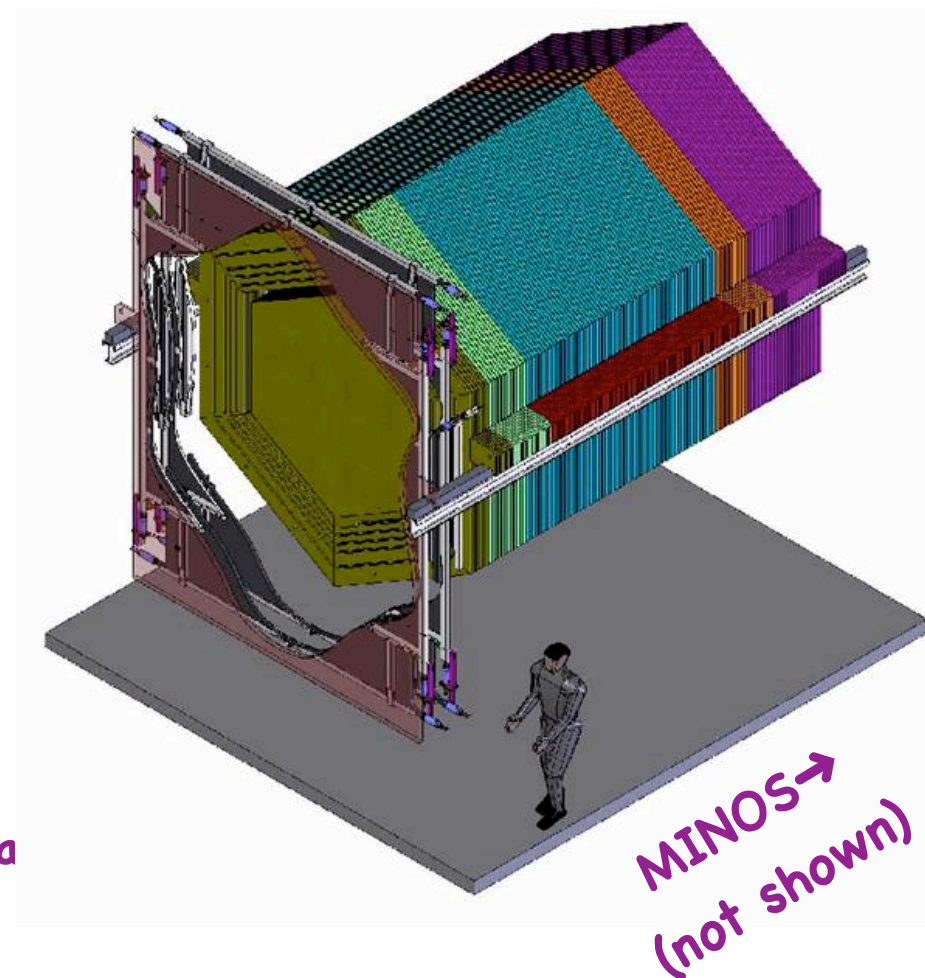


Final plane module installed March 15, 2010!



MINERvA

- We will expect everyone to start remembering this sort of introduction soon, but here it is one more time...
- Low energy (few GeV) neutrino scattering experiment.
- Fine grained, fully active tracker region with downstream and side ("barrel-like") calorimeters.
- Will provide useful cross section data to oscillation experiments (MINOS, NOvA, T2K, LBNE) and study nuclear physics with a pure Weak probe (e.g. nucleon axial formfactor as a function of Q^2 , nuclear modification of structure functions with a neutrino probe).



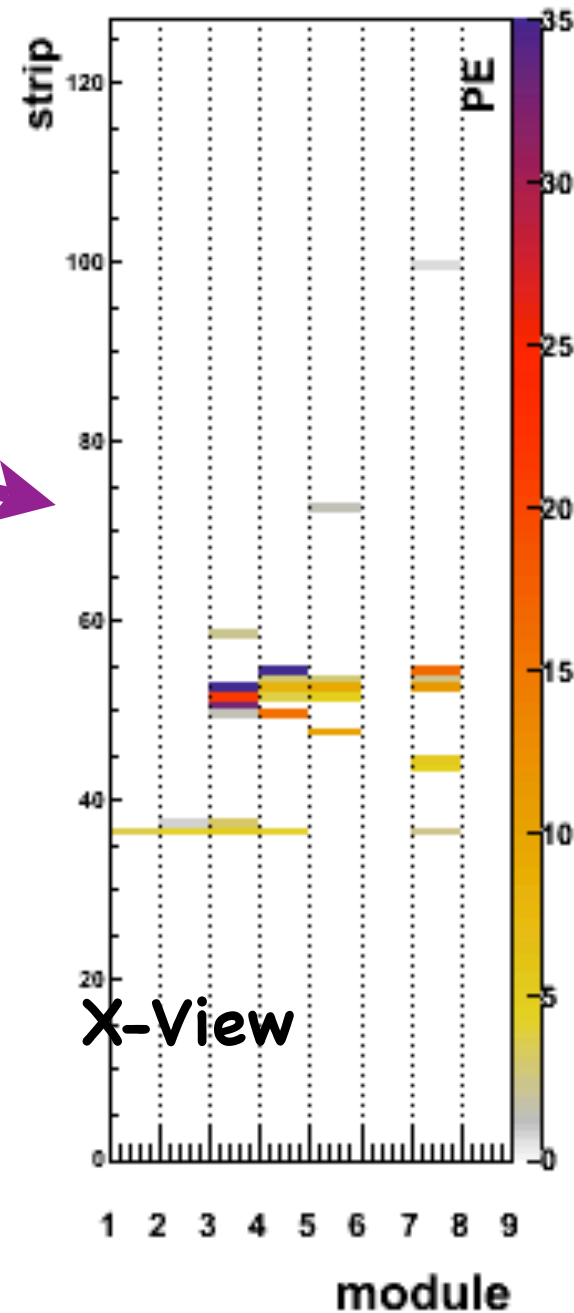


From April 6, 2009, FNAL AEM...



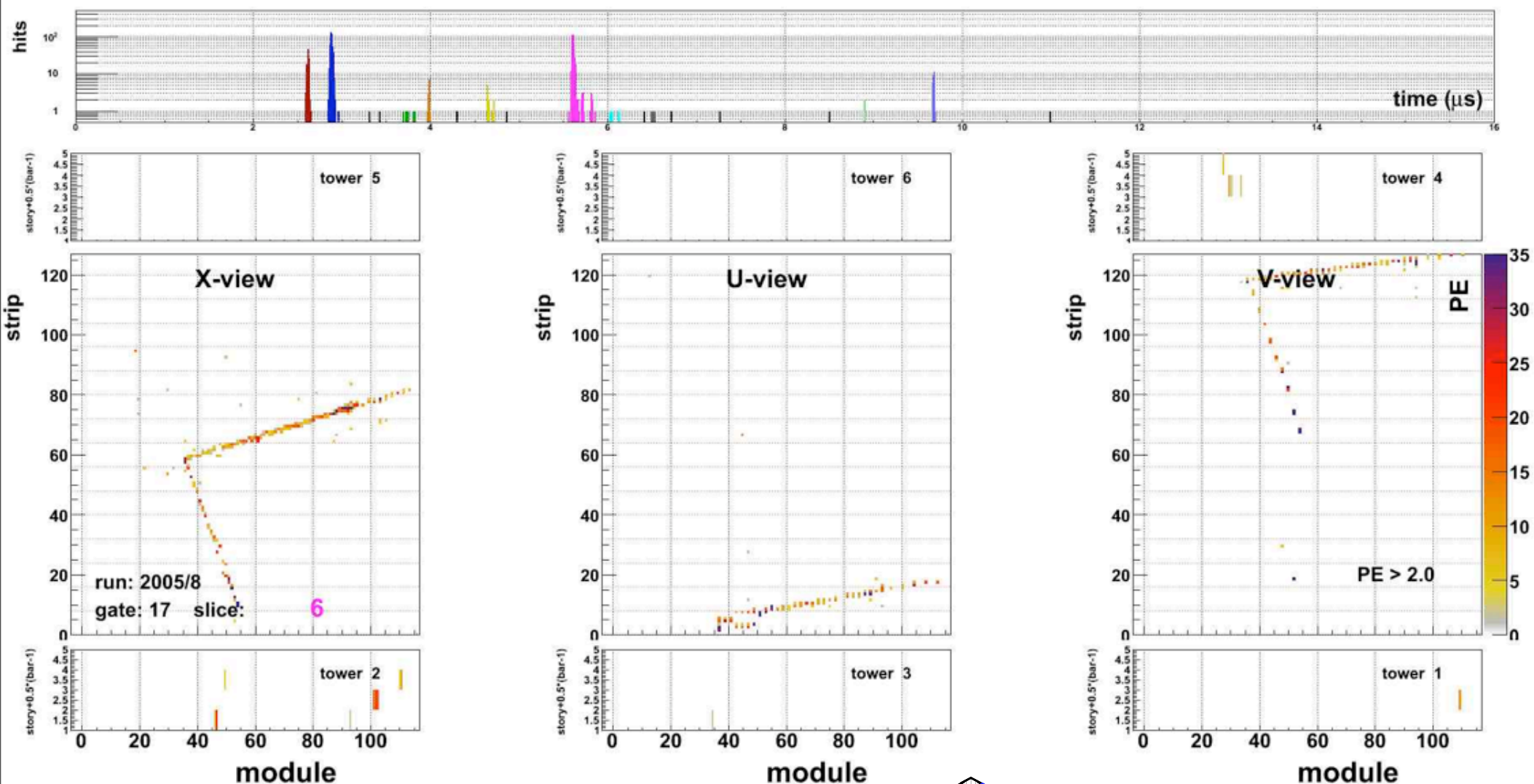
Our cluster of advanced
(coffee-drinking) neural
nets has even identified
some probable neutrino
interactions!

This was MINERvA's
first neutrino event
candidate!

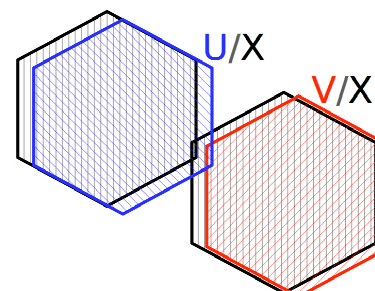




Things look much more convincing now!



Interleave U and V planes
(rotated 60°)





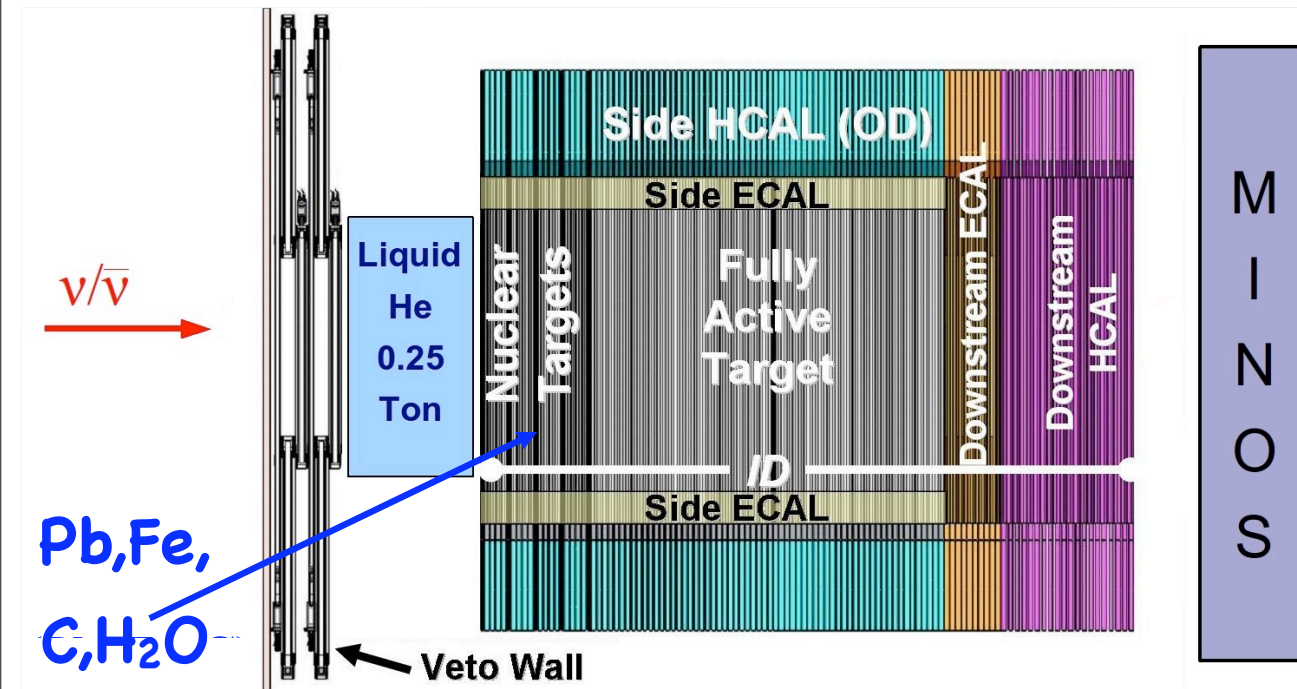
Main Phase of Installation Complete!*

- *We can't claim total victory yet: our Veto Wall, Helium Cryo-target, and Water Nuclear Target are not installed.
- But, we have installed and instrumented 120/120 of our modules!
- Full detector integration into readout took place March 18.
- 24/7 operation of the detector carried over directly from anti-neutrino run with the "Frozen Detector" (64 module stack-up installed by November of last year).

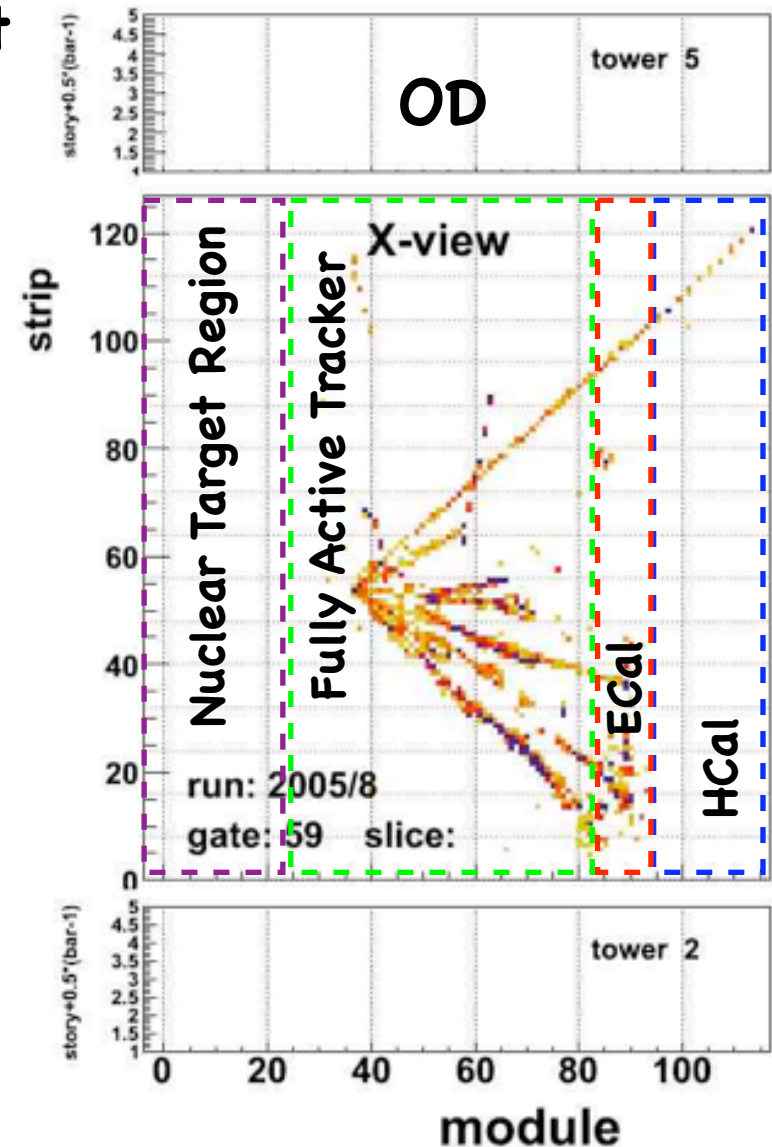


Main Phase Complete!

Veto Wall, Water Target, and Helium Target still to be installed. Everything else is in!



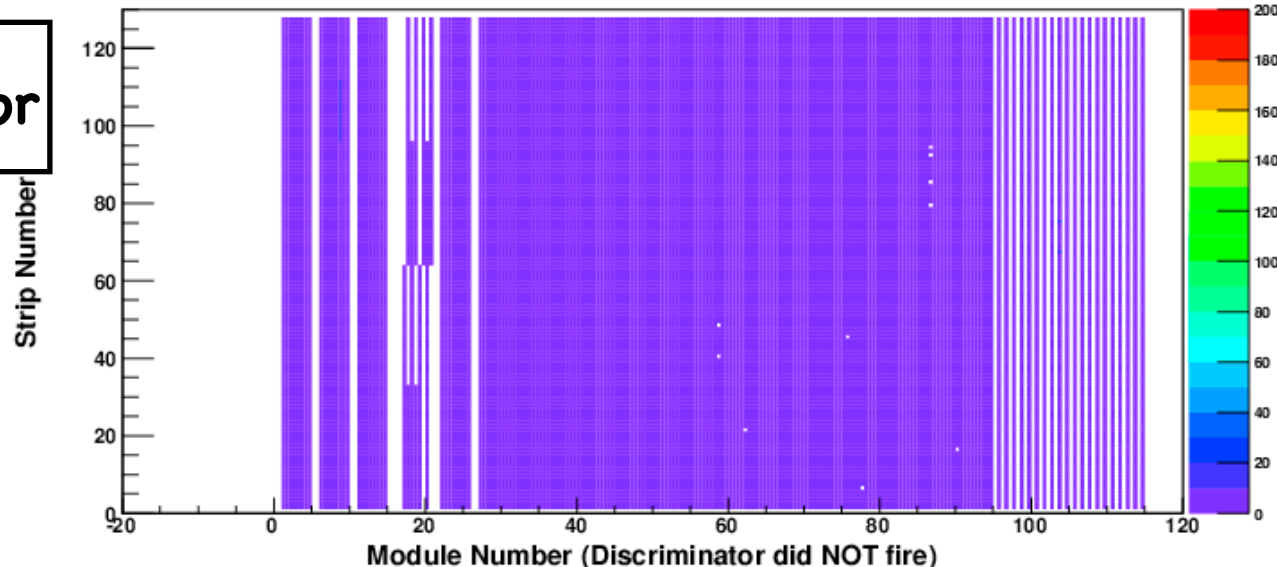
MINOS kindly functions as our muon spectrometer.



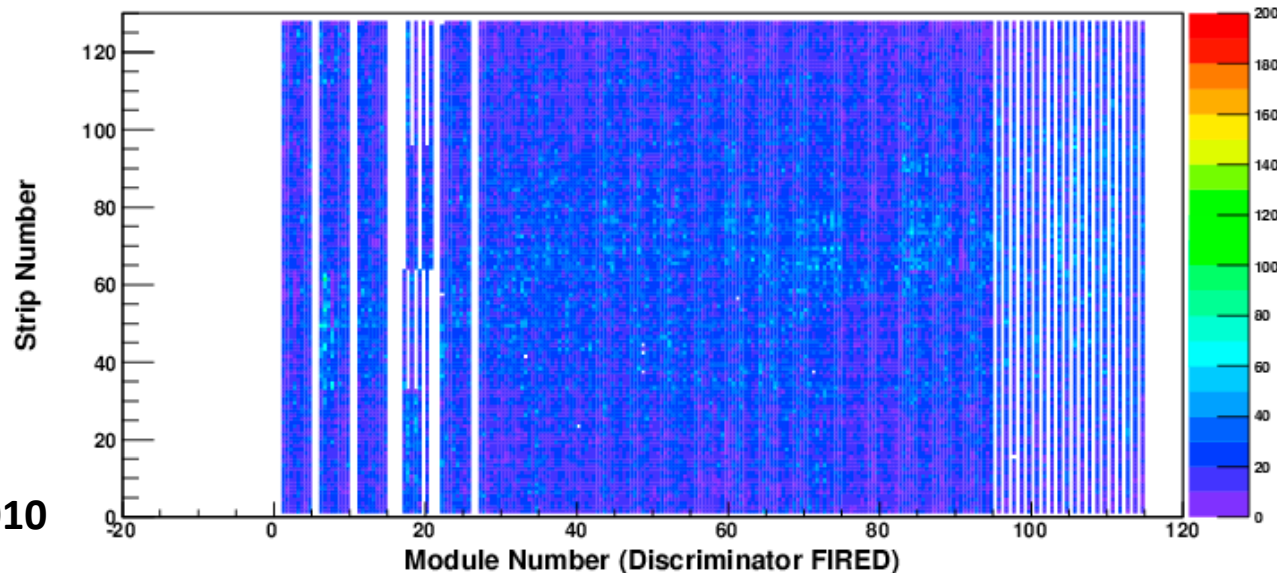


Inner Detector

Avg Qhi for Strip (y) vs Module (x)



Avg Qhi for Strip (y) vs Module (x)



Only 10 dead pixels in
our inner detector!

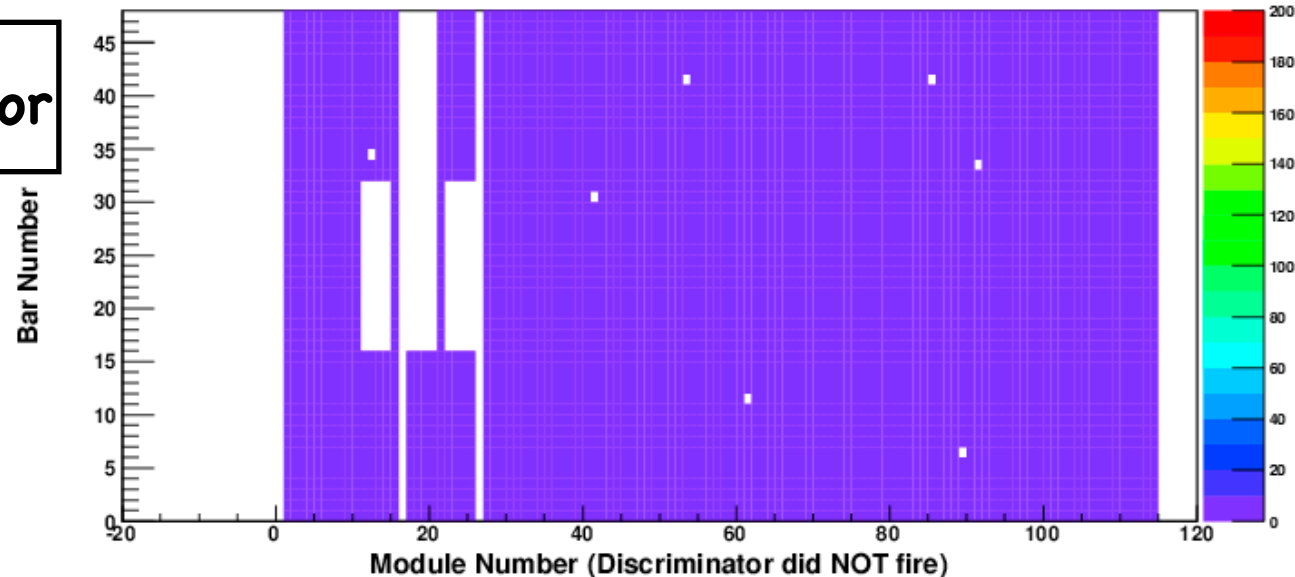
(Large blank spaces
are software mapping
errors or un-
instrumented regions.)

run 1346
subrun 2
03/22/2010
owl shift



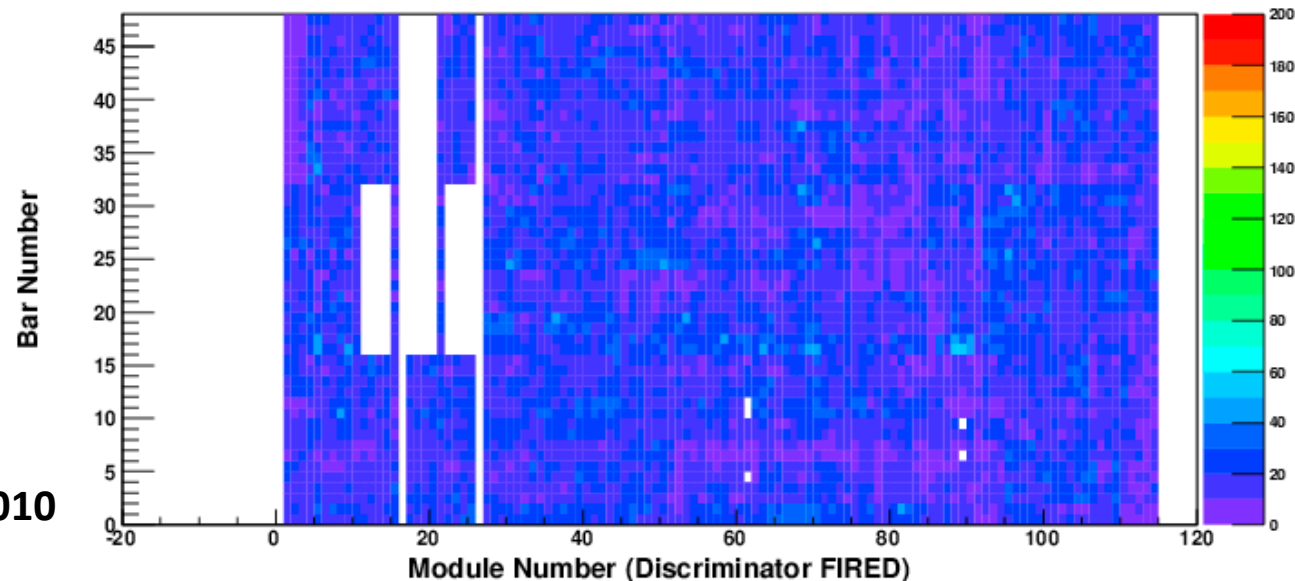
Outer Detector

Avg Qhi for Bar (y) vs Module (x)



Only 5 dead pixels in
our outer detector!

Avg Qhi for Bar (y) vs Module (x)



15/31,424... Not bad!

run 1346
subrun 2
03/22/2010
owl shift

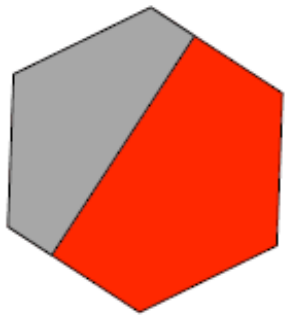


Full Physics Program Underway

Red=Fe, Grey=Pb, Black = C

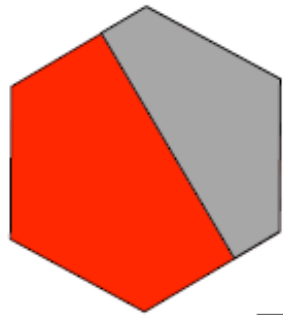
2.5 cm Fe/Pb
110 kg each

2.5 cm thick
230 kg Fe/Pb



High statistics
comparison of Pb/Fe

2.5 cm thick
230 kg Fe/Pb

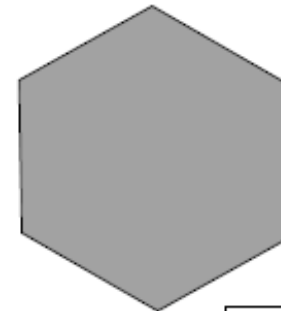


7.5 cm C
140 kg

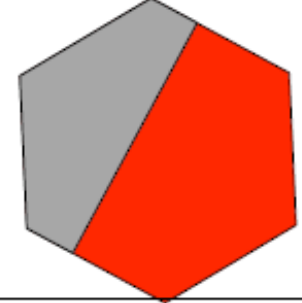


Comparison of Pb/C/Fe
with same detector
geometry

0.75 cm Pb
170 kg



1.5 cm thick
115 kg Fe/Pb



Thin targets for low
energy particle
emission studies

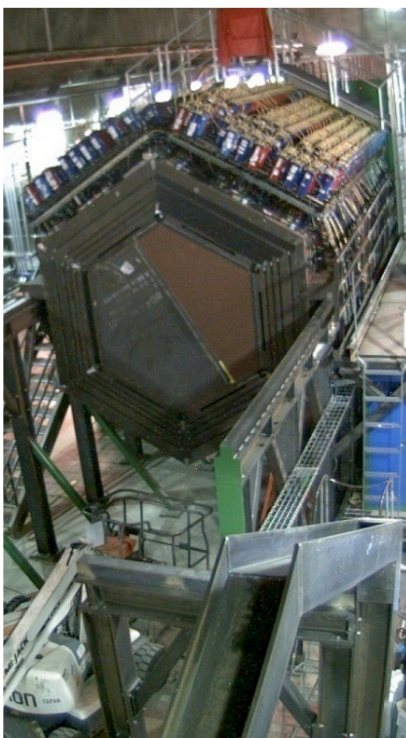
Thin Pb target also serves to insure
good photon detection efficiency

Nuclear Targets (only Water & Helium Targets are missing).



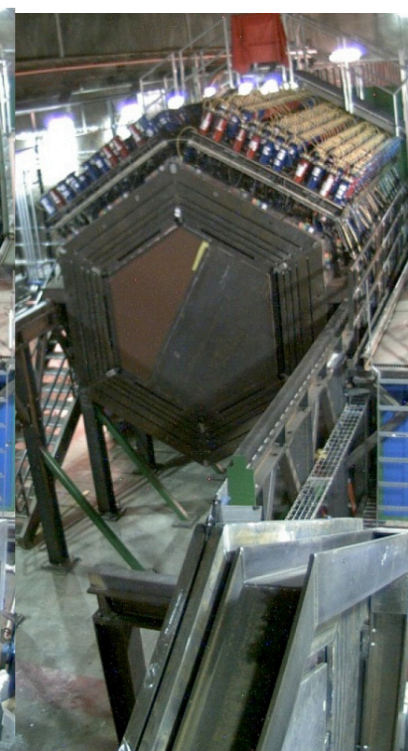
Full Physics Program Underway

Iron/Lead



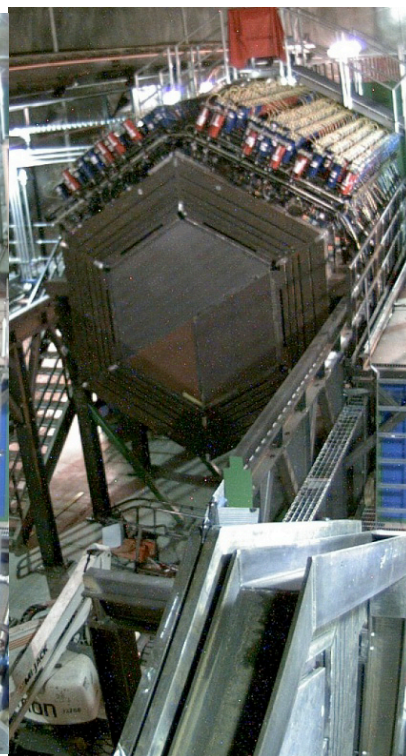
3/15

Lead/Iron



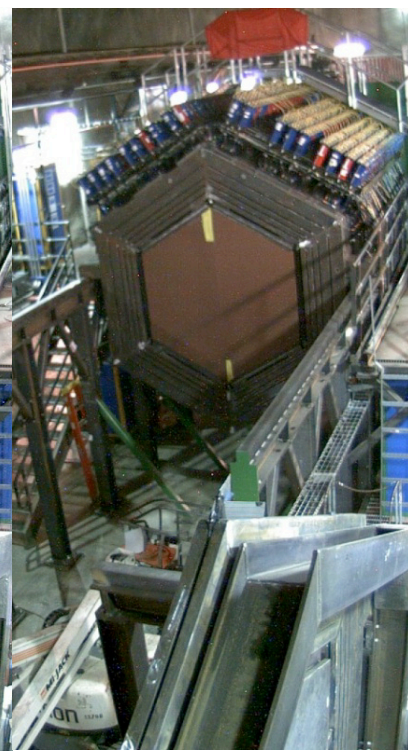
3/10

Lead/Iron
Graphite



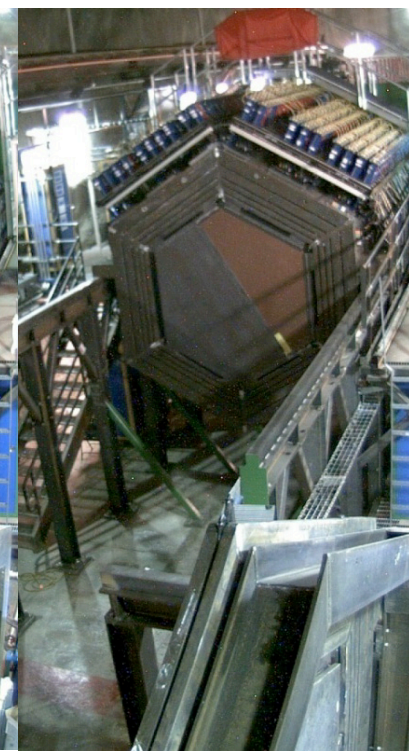
3/08

Lead



2/19

Iron/Lead



2/16

Nuclear Targets (only Water & Helium Targets are missing).

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Fermilab AEM

2010.March.29

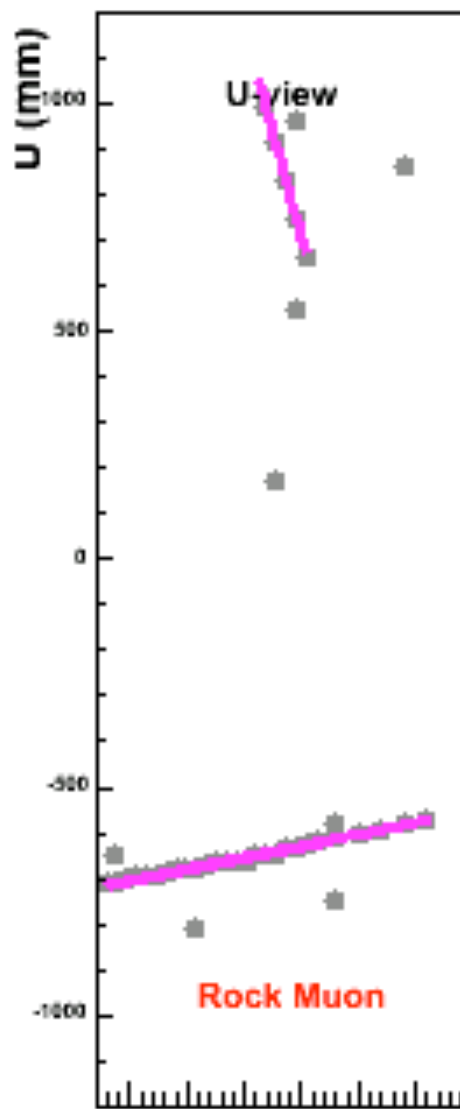
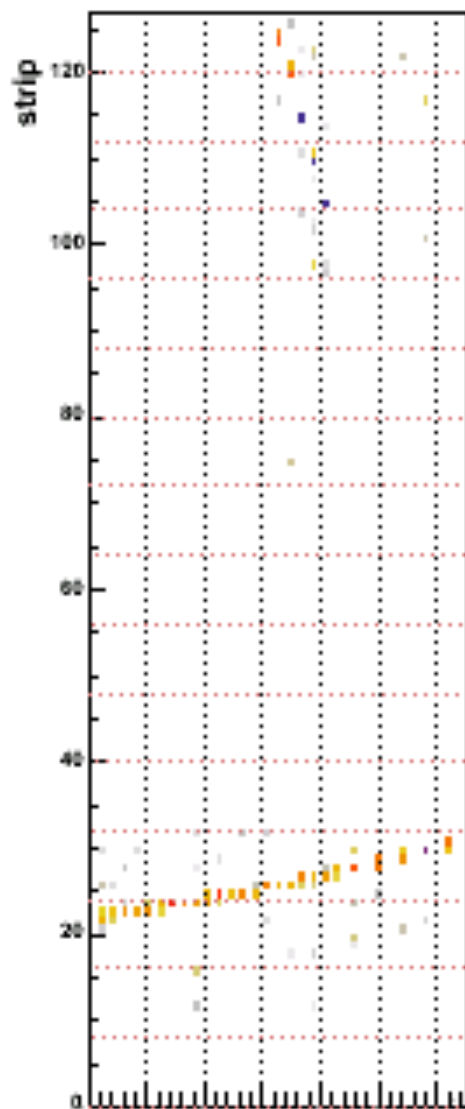


Calibration & Analysis

- HV tuning (iterative light injection) is complete for the full detector and all Front End Board (FEB) electronics calibrations are finished, so we have an absolute photo-electron calibration.
- Measurement of attenuation parameters of every strip is available from our radioactive source mapping program.
- Next steps: use our rock muon sample from anti-neutrino beam to measure in-situ timing offsets, detector alignment, relative response, and PMT cross-talk.
- We are planning a first full production pass for our Frozen Detector (anti-nu) data in two weeks!



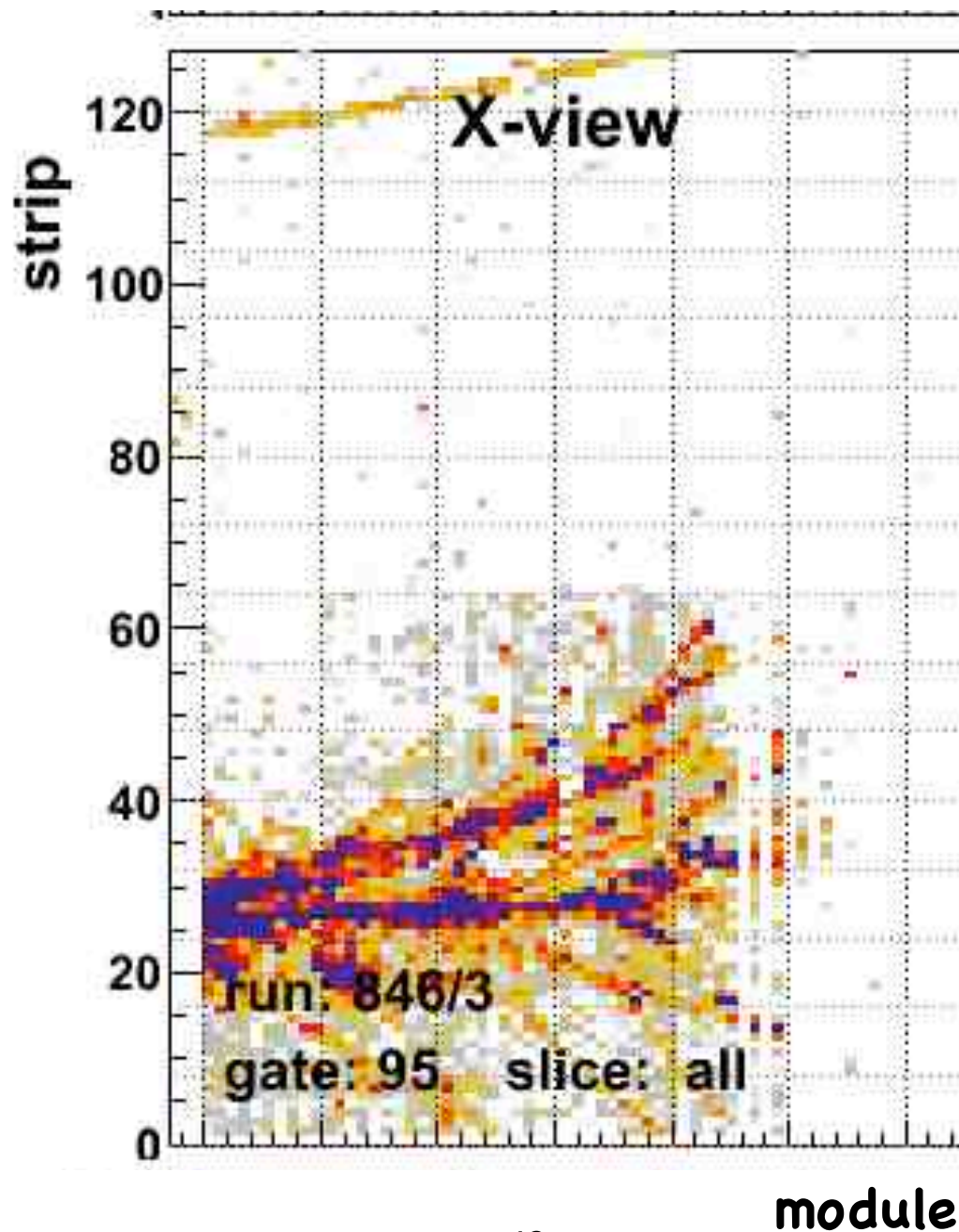
Tracking: We've got this topology down!



(Subset of the Frozen Detector: Each "square" is 5 modules)



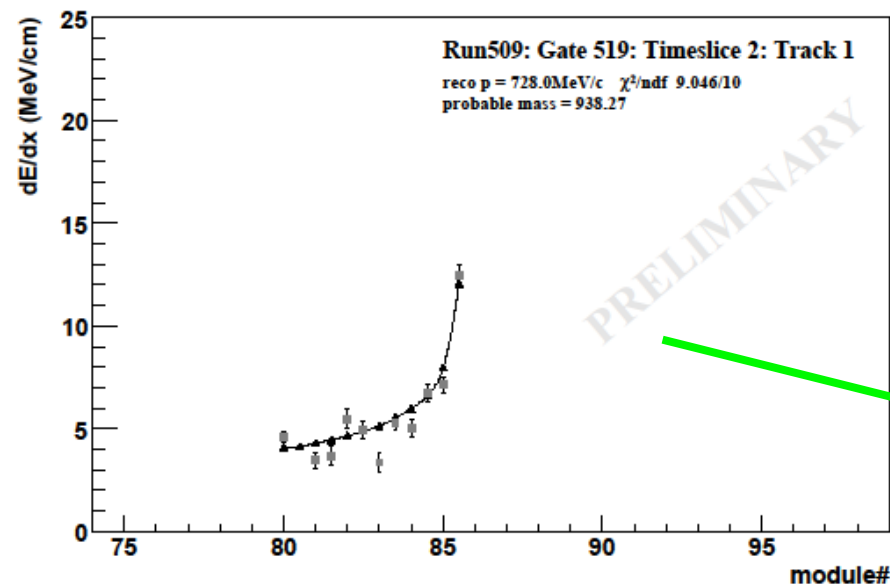
Tracking: We're still working on these...



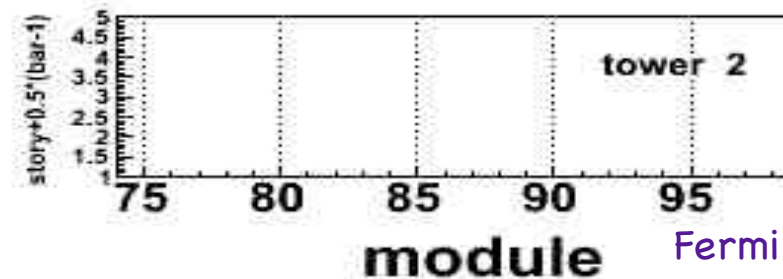
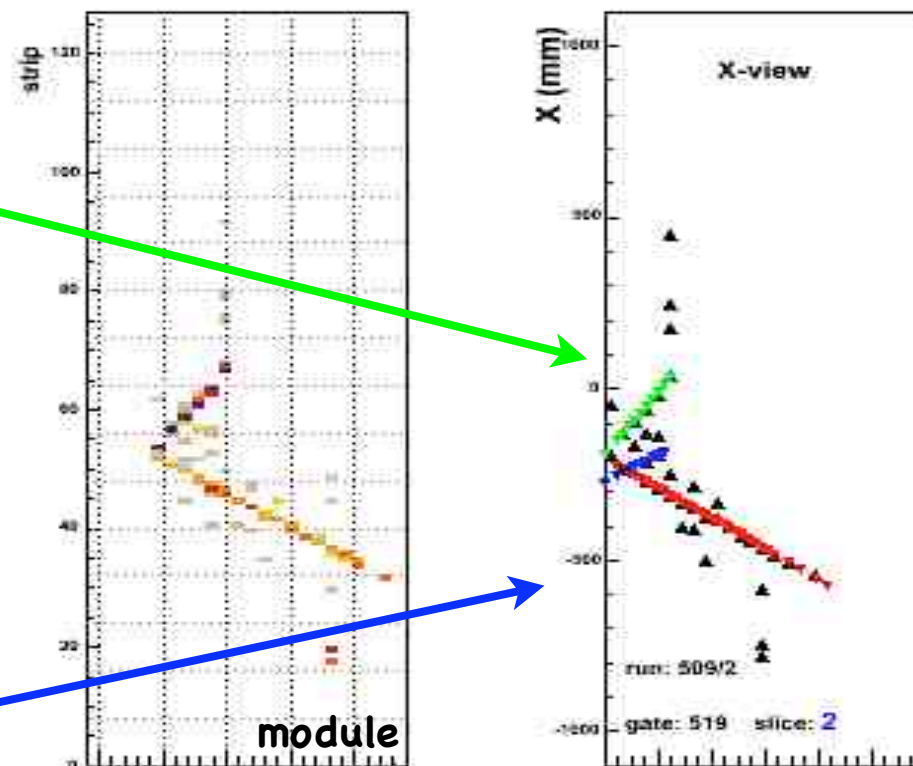
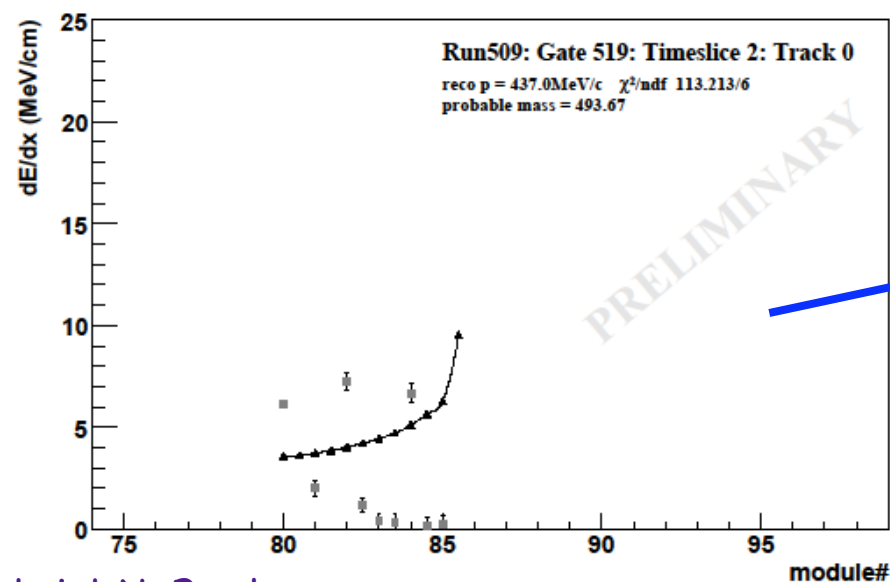


Tracking: dE/dx provides successful disambiguation!

dE/dx Profile for a tp scan_ge



dE/dx Profile for a tp scan_ge





**We would like to offer a
special thanks to everyone
at the lab who has
supported us in this very
demanding endeavor!**



Thanks for Listening!